

# ANGLE and LINE

A Quarterly Newsletter by COWAN ASSOCIATES, INC.

Engineers • Designers • Surveyors  
Serving Business, Municipalities, and Industry since 1958



## GET USED TO IT - SUSTAINABLE SITE DEVELOPMENT IS HERE TO STAY

By Scott P. McMackin, P.E.

It has been a buzz word for years in the land development industry, but “sustainable design” has quickly become a major consideration in site development of any size or type. While many who deal with land development are familiar with the phrase, most may not be fully aware of the concept and impact of its implementation.

Sustainable site development is not, by any means, a new concept, however, it took the NPDES Phase II regulations to force the issue into the forefront of land development design.

The Webster definition of sustainable is “of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged.” In site development, sustainability largely revolves around water resource management. In the past, the “typical” philosophy of stormwater was that it was a nuisance problem which must be managed by conveying it away from the site as quickly and efficiently as possible.

The traditional engineering solutions included curbing, inlets, storm sewers and culverts. While this philosophy appears at first glance to be efficient and effective, it can disrupt the natural hydrologic cycle and can have a detrimental effect if not managed properly.

Sustainable site development is a wholesale change in philosophy to consider stormwater as an ecological resource to be integrated into development by minimizing adverse impacts to natural systems, conserving water and energy, and reducing waste. Sustainable development attempts to accomplish this by allowing stormwater to continue in the natural cycle by infiltration and evapotranspiration, preserving existing waterways, managing and keeping runoff on site, and filtering stormwater which leaves the site.

Sustainable site development also provides the added

benefit of allowing natural features of the landscape to be incorporated in the aesthetics of landscape design. This wholesale change in philosophy, however, does not have to mean radical change in land development design. While implementing some sustainable concepts is difficult, some techniques require only slight modifications to current design practice. While still important for flood insurance, focus can be shifted from the large, 100 year storm events, to managing the everyday rainfall events. This is where the benefits can be realized.



One major hurdle to overcome and gain acceptance of this new philosophy is the issue of cost to implement these new designs into site developments. In our experience, this can be a valid concern for developers, particularly in initial construction costs. There is growing evidence, however, that long-term and life-cycle cost benefits can be realized. As the concepts take hold and mature, it is likely that installation and cost savings can be realized.

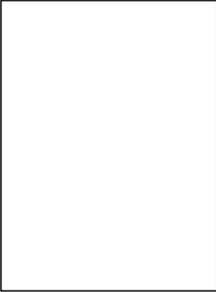
Other desirable financial and tax incentives can be pursued using these principles. One popular program is the United States Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED) program, which couples environmentally friendly site design principles with environmentally friendly building design principles.

If implemented properly, considerations such as wet swales, rain gardens, biofiltration swales, stormwater wetlands, porous pavements, subsurface infiltration devices, and many other structural and non-structural methods can be used on a wide variety of sites to produce more attractive developments and livable communities.

The concept of sustainable site development is now a requirement of NPDES Phase II, so any one involved with land development, from developers, to homeowners, to public officials, to contractors, will sooner or later come into con-

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## EMPLOYEE SPOTLIGHT



Cowan Associates, Inc. is pleased to announce that Angelika B. Forndran, P.E., has joined the firm in the position of Director of Environmental Engineering. Ms. Forndran brings with her a broad-based experience in the field of wastewater collection, wastewater treatment, water resources, watershed protection, and regulatory review and permitting.

Ms. Forndran has a Bachelors Degree in Civil Engineering from The Cooper Union, and a Masters Degree in Environmental Engineering from Manhattan College. She is a licensed Professional Engineer in New York and Pennsylvania.

Ms. Forndran has worked in a wide range of capacities during the past 30 years in New York, Ohio, and Pennsylvania. Her early career was in the Department of Environmental Protection of New York City. The highlights of this experience include monitoring the recovery of the Hudson River to attain water quality standards. Performing engineering evaluations and design of innovative alternatives for wastewater treatment and combined sewer overflow abatement, she joined the volunteer team of authors who wrote the "Manual of Practice, Combined Sewer Overflow Pollution Abatement," published by the Water Environment Federation.

While the primary focus is on working "hands on" with clients to complete projects, Ms. Forndran also volunteers. Ms. Forndran is President-elect of the Lehigh Valley Chapter of Professional Engineers, and an active member of the Lehigh Valley Section of the Society of Women Engineers. She serves on the Upper Milford Township Planning Commission and has participated in several local public committees. Joining other professionals in these organizations, she recognizes the importance of public education and outreach to students. She has taught Environmental Science as an Adjunct Instructor for Alvernia College.

Angelika Forndran can be reached at 215-536-7075, extension 129, and by email at [abf@cowanassociates.com](mailto:abf@cowanassociates.com).

### GET USED TO IT

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tact with this new change in philosophy. Cowan Associates, Inc. personnel are quickly becoming experts in this field and welcome any inquiries.

### REAL ENGINEERS...

Real Engineers consider themselves well dressed if their socks match.

Real Engineers buy their spouses a set of matched screwdrivers for their birthday.

Real Engineers wear moustaches or beards for "efficiency," not because they're lazy.

Real Engineers have a non-technical vocabulary of 800 words.

### "A Breath of Musk, of Mossy Mold with Vague Allurements Keen"

*By Johann F. Szautner, P.E.*

This catchy line from the poem, "The Path to the Woods" by Madison Cawein, brings back some happy childhood memories. I see myself in my aunt's farmhouse, somewhere in the hinterland of Austria, playing in the cellar which also housed the springhouse. The trough beneath the wooden log pipe which faithfully delivered its endless stream of cold, clear and, yes, tasty water, is encrusted with green furry and grayish black, slimy mold. The mold also grew abundantly along the stone foundation wall, and I loved to smell this "breath of musk" and pull mold off the wall in sheets, a pleasure most likely denied to most children in our day and age, since we know of the potential allergic reactions to some mold spores by some people. I bet that most parents would not only not allow their children to play with mold, but also do their hardest to eliminate any environment in our living space which is conducive to mold growth.

For mold to find favorable conditions for propagation, it will need an environment which provides adequate moisture, the right temperature and, of course, a food source, which can be any material containing organic compounds. Anyone who is concerned with building design, construction, occupation, operation, and maintenance, which includes pretty much all of us, needs to know this.

There is nothing we can do to prevent mold spores from entering our building spaces, and unless we are dealing with new construction, there is little we can do to control potential food sources. However, we can control environmental conditions, primarily by controlling moisture build-up in our building spaces, including the spaces normally concealed from our view, including attic, basement, crawl and wall cavity spaces.

Moisture from precipitation enters building envelopes almost exclusively in liquid form, either as rain or as melted water from ice and snow. Water exposure of horizontal or sloped surfaces, as we have on roofs, is almost always greater than that of walls.

Good drainage from roof surfaces is imperative, as is the requirement for them to be watertight. Penetrations such as chimneys, vent pipes, or skylights are potential leakage points and must be isolated with flashing.

In winter, our roofs are susceptible to the phenomenon of ice damming. Ice damming is caused by melting snow cover at higher portions of the roof and subsequent refreezing at lower portions, especially if those are not over heated spaces, such as the eaves. Water intrusion through building façades is the result of rain, often wind driven. The two strategies for controlling rainwater intrusion into your walls are to reduce the amount of rainwater deposited on building walls and to control rainwater that is deposited in building walls.

In addition to the choice of façade materials and wall assemblies, we can also minimize the amount of rainwater reaching the walls by providing generous roof overhangs and effective gutter collection systems.

Thresholds of doors that open to balconies represent one of the most common sites of serious water intrusion into walls. Balcony surfaces must always be sloped to drain away from the wall, and all wall openings must be flashed. To avoid rainwater infiltration into walls, seamless barrier systems or drainage systems, or a combination of both, will be required, depending on the wall assembly design.

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## “A Breath of Musk, of Mossy Mold with Vague Allurements Keen”

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In addition to controlling humidity from exterior water infiltration, we must also control interior humidity generated by condensation. We may remember from high school science classes that moisture laden air migrates to cooler surfaces because of the vapor pressure differential. We are all familiar with fogged up windows on a cool day, especially in kitchens and bathrooms, if they are not properly ventilated. In summer, you may have sweating of water pipes or toilet tanks on a warm day, if they are not properly insulated.

Indoor humidity can easily be controlled with air exchanges, dehumidification, and insulation. Our universal comfort level for temperature in an occupied space lies between 67° and 74° F. atmospheric temperature, also known as “dry-bulb” temperature in mechanical engineering lingo. This typically sets the dew point somewhere above 36° F, which corresponds to a relative humidity in the 32% to 25% range. However, our climate conditioned occupied spaces often produce a relative humidity level in excess of 40%.

Once humidity increases significantly above 35%, mold spores will find this a cozy place to settle in and start a colony, especially if they find a little bit of food in wallpaper, wool carpets or, if nothing else is available, in deposits of human and pet dandruff, dead dust mites, and other similar organic substances.

Reduction of moisture build-up can be readily accomplished by ventilation. Spot ventilation in bath and laundry rooms and kitchens may not be sufficient unless you also have a central mechanical ventilation system. Opening windows, if they are operable, may be the most convenient way to accomplish a fast and efficient air exchange. The American Society for Testing and Materials “ASTM” issued a standard guide in 2000 for limiting water induced damage to buildings. This standard, referred to as Standard E-241-00, is also an excellent guidance tool in mold control by giving concrete information of how to control the environment in an occupied space.

Following these guiding principles, which I attempted to summarize in this little article, will give us an interior environment which may do away with the “vague allurements” offered to some of us by our olfactory senses when we smell mold, but will assure us of a healthier indoor environment - an indoor environment, “where the child I used to be still wanders with his dreams,” to end with the final lines of Madison Cawein’s poem.

### Cowan Associates’ President Bill Kee Receives Citation

By Bobbie J. Fridnt, RLA

As one of ten recipients featured in The Eastern Pennsylvania Business Journal, Mr. William (Bill) D. Kee, P.E., received the honorable Eastern Pennsylvania Business Journal Spotlight Award Nomination on Wednesday, May 26, 2004.

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## Do I Need A Permit?

By Michael R. Smith, EIT, CBO

A question came up recently during a discussion in our staff meeting, with reference to replacing a roof on an existing structure. Why do we need to apply for a building permit to replace an existing roof?

Apparently not everyone is aware that the Pennsylvania Uniform Construction Code (UCC) has taken effect this year and all of the State’s local municipalities will implement the Code either directly or with the assistance of third party agencies and the Department of Labor and Industry.

The UCC has adopted the 2003 edition of the International Building Code (IBC) as the standard code for all projects which were under contract for design, or began construction after the date of adoption by the municipality. The legislation which adopted the UCC allows municipalities to keep some of their specific addenda to the previous construction codes (e.g. BOCA) as long as the addenda conform with and were more stringent than the IBC. Therefore, the Uniform Construction Code is not uniform from one municipality to the next.

I would like to give you some examples of projects which would normally be performed at your home, and try to answer the question - Do I Need a Permit?

Replace a roof? Yes, if you are replacing more than 25% in one year.

Replace your heater or central air conditioner? Yes, but not if they are portable.

Replace a water heater? Yes.

Replace countertops? No.

Replace cabinets? Yes, but if they are less than 69 inches tall and moveable - No.

New carpet, tile, or flooring? No, as long as you are not replacing the sub-floor.

Replace a toilet? No, but don’t change the supply pipe or you will.

Fix a leak in a drain pipe? No, as long as it is not concealed in a wall and you do not change the pipe (no minimum length given).

Unplug a stopped-up drain? No.

Change an electrical receptacle? No, as long as the new receptacle is the same type as the old, and less than 20 amps.

Install or replace a ground fault circuit receptacle (GFCI)? Yes.

Replace windows or doors? No, but only if the structural framing is not altered.

Install a patio cover? Yes.

Install or replace a deck? Yes.

Replace my sidewalk? No, but only if it is less than 30 inches above the surrounding grade.

Gas or electric stove or oven? Yes, but not for dishwasher or range hood.

Paint? No.

Shed? No, if less than 500 square feet.

These are just a few examples taken from the 2003 ICC Residential Code and UCC Code. I would like to caution you that the examples above may or may not apply in your city, township, or Borough due to the municipality’s local adoption ordinance.

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**Cowan Associates, Inc.**

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**Do I Need a Permit?**  
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If you are planning to perform work on your residence and you are unsure as to the need for a permit, contact the certified building official (CBO) for your municipality for assistance.

The Pennsylvania Uniform Construction Code is a good idea in theory, but in practice is still not very uniform. I expect it will be some time before designers, engineers, code officials, builders and the public understand fully the requirements under this new Code.

**Cowan Associates' President Bill Kee Receives Citation**

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The award included a spotlight article, a framed photograph with award certificate, a CD media commercial of his accomplishments, and a citation from Governor Rendell. His professional engineering accomplishments and tremendous community involvement were highlighted in the Journal and by multimedia at the Awards Event in Fogelsville, PA.

Mr. Kee's engineering career began at West Virginia University where he received his Bachelor of Science and Master of Science in Civil Engineering in 1963 and 1964,

respectively. He joined Cowan Associates, Inc. (CAI) in 1973, and his drive for success and excellence led him from Project Engineer, to Associate, to President in 1998. Under his leadership, CAI diversified to add a testing laboratory and geotechnical engineering services. The award recipient designed the Milford-Trumbauersville Sewage Treatment Plant, being one of the first tertiary plants in the region for which he received a citation for design excellence by the Bucks County Chapter of Professional Engineers in the early seventies.

His current community involvement includes the local Montgomery County Boroughs Association and Quakertown Rotary Club, where he is a Past President. He is active in local events and fundraising such as the Annual Quakertown Rotary Club Golf Outing to benefit local charities. He was instrumental in starting the Rotary Club's Honor Card Program for high school students excelling academically.

As President of Cowan Associates, he provides guidance to all employees, promoting the company's technical expertise and business growth. He is an energetic and professional mentor to all those around him. He shows professionalism in all aspects of his life and is a strong advocate of personalized, prompt commitment to clients, colleagues, and friends.



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